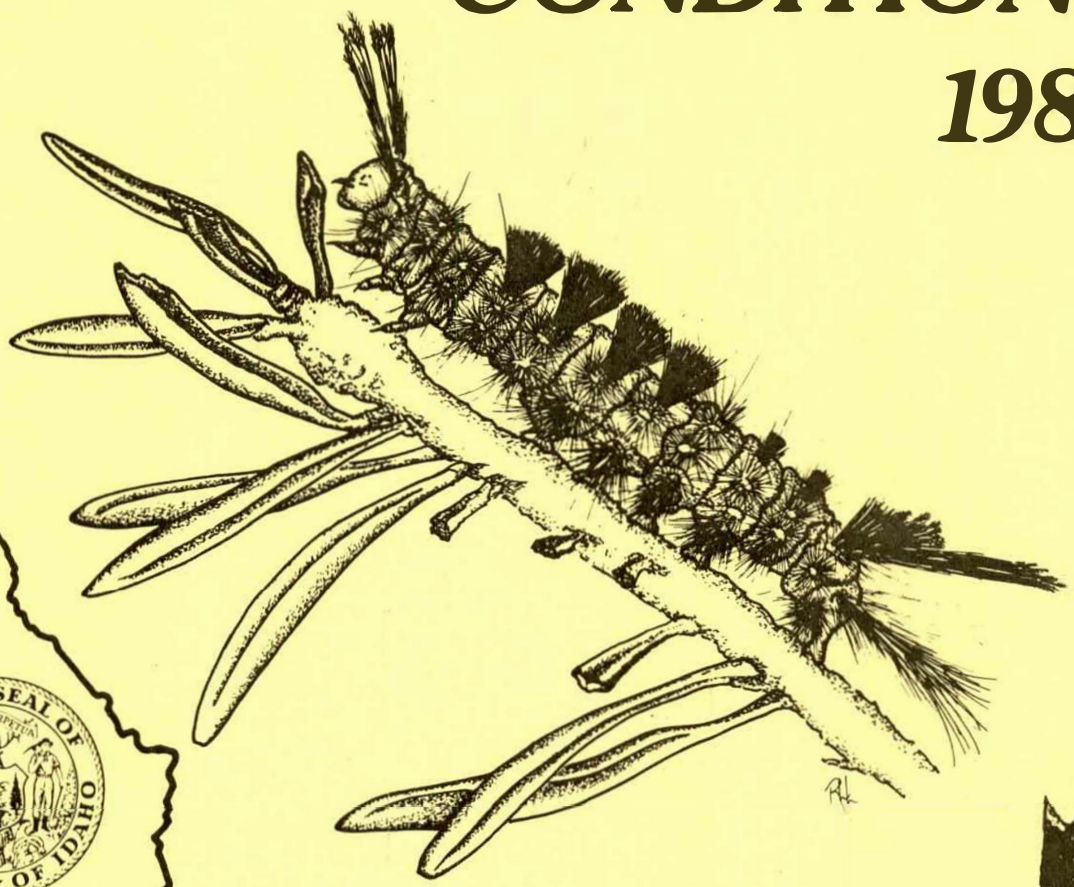
IDAHO FOREST INSECT and DISEASE CONDITIONS 1982



IDAHO DEPARTMENT of LANDS

USDA Forest Service
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FOREST INSECT AND DISEASE CONDITIONS IN IDAHO

1982

by

John W. Schwandt, Forest Pathologist
R. Ladd Livingston, Forest Entomologist
David Beckman, Insect and Disease Technician
Idaho Department of Lands
Coeur d'Alene, Idaho

Robert L. James, Plant Pathologist
Wayne E. Bousfield, Entomologist
USDA Forest Service, Region 1
Missoula, Montana

James T. Hoffman, Plant Pathologist
R. W. Thier, Entomologist
USDA Forest Service, Region 4
Boise, Idaho

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TABLE OF CONTENTS

Page

INTRODUCTION 1

CONDITIONS IN BRIEF. 2

INSECTS

BARK BEETLES

Mountain Pine Beetle 2
Douglas-fir Beetle 3
Fir Engraver Beetle 3
Pine Engraver Beetle 3
Western Pine Beetle. 3
Spruce Beetle. 3
Western Balsam Bark Beetle 3

DEFOLIATORS

Western Spruce Budworm 6
Douglas-fir Tussock Moth 7
Larch Casebearer 10
Pine Butterfly 10

MISCELLANEOUS INSECTS

Western Tussock Moth 11
Pyralid Moth 11
Cranberry Girdler Moth 11
Flatheaded Fir Borer, Douglas-fir Engraver Beetle, and Hemlock Engraver Beetle. 12
Gypsy Moth 12
Douglas-fir Needle Midge 12
Western Pine Shoot Borer 12
~~Sequoia Pitch Moth~~ 12

DISEASES

FOLIAGE DISEASES

Larch Foliage Diseases 13
Red Band Needle Blight 13
Lophodermium Needle Cast on Christmas Trees. 13
Elytroderma Needle Cast. 13
Pine Needle Rust 14
Miscellaneous Foliage Diseases 14

TABLE OF CONTENTS

	Page
ROOT DISEASES	14
DWARF MISTLETOES	16
STEM CANKERS	17
White Pine Blister Rust	17
Stalactiform Rust Canker	17
NURSERY DISEASES	
Grey Mold	17
Meria Needle Cast	17
Lophodermium Tip Blight	18
Sirococcus Tip Blight	18
White Pine Root Disease	18
Western Gall Rust	19
LIST OF RECENT PUBLICATIONS	19
DIRECTORY OF PERSONNEL	23
APPENDIX	
Key to trees killed in designated map areas	25
Map showing areas infested with fir engraver beetle, western spruce budworm, and spruce beetle	
Map showing areas infested with Douglas-fir beetle, mountain pine beetle, and pine engraver beetle	
INDEX OF INSECTS AND DISEASES	27

INTRODUCTION

This report summarizes the results of aerial and ground surveys conducted during 1982 by the Idaho Department of Lands and the USDA Forest Service, Northern and Intermountain Regions, to detect and monitor forest insect and disease outbreaks or problems in Idaho. Major insect damage on forested lands of all ownerships within Idaho is outlined on maps and tables in the Appendix of this report. Because of program adjustments, the major portions of the Caribou, Challis, Clearwater, and Idaho Panhandle National Forests were not covered by aerial survey in 1982.

Due to the difficulty of making accurate tree mortality counts while flying aerial surveys, the table numbers should be taken only as estimates of damage. Previous comparisons of aerial survey data with ground check plots have shown that estimates of numbers of trees killed are consistently low. However, the location and trends of damage from year to year can be determined by comparing the maps and yearly counts from previous reports.

CONDITIONS IN BRIEF

The mountain pine beetle losses declined for the second year with most of the mortality occurring in the southeastern part of the State. Two smaller outbreaks in northern Idaho continue to cause localized mortality. The fir engraver beetle population continues to remain at a low level in northern Idaho. Douglas-fir beetle populations are at a low level except for increased activity on the Nezperce National Forest and portions of the Clearwater drainage. The pine engraver beetle mortality was very low throughout the State. Spruce beetle activity increased in 1982 to outbreak proportions in the drainages north of Priest Lake and in other areas of northern Idaho.

Defoliating insects have increased in activity, especially in southern Idaho where western spruce budworm defoliation has increased both in extent and intensity. Western spruce budworm defoliation was found on only 4,635 acres on the Bitterroot National Forest in northern Idaho. The pine butterfly defoliated approximately 5,800 acres of ponderosa pine near Cascade and Banks, Idaho, and flights of the conspicuous, white butterflies were observed in several other locations throughout central Idaho. Activity of the Douglas-fir tussock moth has increased considerably with over 4,000 acres of defoliation in the Owyhee Mountains of southwestern Idaho. In northern Idaho defoliation was confined to ornamental trees in several locations, but pheromone trapping of adults showed a dramatic increase in activity. We feel, however, that we are at least 2 years away from observing extensive tussock moth caused defoliation in northern Idaho.

The widespread occurrence of many foliage diseases observed over the past few years has greatly subsided. Most of the foliage problems were still observed, but were restricted to a few isolated areas. Nursery

and Christmas tree growers have been successful in keeping foliage diseases in check with periodic applications of fungicides. Root diseases continue to be the major disease in most northern forests, while dwarf mistletoes are of primary concern in southern portions of the State. White pine blister rust is a chronic problem throughout northern Idaho, but new management guidelines and increasing availability of genetically improved planting stock are providing timber managers with new tools to minimize losses.

INSECTS

BARK BEETLES

Mountain Pine Beetle

The number of trees killed by mountain pine beetles continues to decline in Idaho with most of the mortality in the southeastern portion of the State. However, some areas in the southwestern part showed an increase in 1982. Timber management harvests are directed at removing susceptible stands to reduce future losses. This activity, in combination with past active outbreaks, may account for the decline (tables 1 and 2).

Infestations on the Targhee National Forest continued to decline from previous years. In 1982, observed mortality was 237,025 trees. This compares with 713,447 in 1981 and approximately 4 million trees in 1980. The Caribou National Forest showed a slight increase in trees killed.

Mountain pine beetle activity increased on the Sawtooth National Forest from 2,683 trees in 1981 to 4,097 trees in 1982. Tree killing was concentrated around the Big Wood River and Warm Springs Creek near Ketchum.

The most noticeable areas of infestation in the southwestern portion of Idaho are Clear Creek east of Cascade, Warm Springs Creek east of Deadwood Reservoir, Fall Creek west of Anderson Creek Reservoir, and Smith's Ferry on the Boise National Forest.

The infestation on the Nezperce National Forest near Elk City was static in 1982 with 2,884 trees being observed as faders. Beetle activity in this area is in the Crooked River, South Fork of the Clearwater River, Deadwood Creek, and Newsome Creek drainages. Biological evaluations in these areas show that 10.7 trees per acre were attacked in 1982. Since there are adequate stands of susceptible trees, we expect this infestation to continue and increase in intensity.

The infestation in the Waha area continued to increase to the north and west of Soldier's Meadows Reservoir. Biological evaluations show that 27 trees per acre were attacked in 1982. The infestation near Cataldo has declined because susceptible trees have been depleted. This small infestation should continue to decline.

Douglas-fir Beetle

Douglas-fir beetle activity decreased in Idaho to 2,950 trees observed fading in 1982. The Nezperce National Forest in Idaho showed the greatest number of faders with 1,114 trees recorded. Biological evaluations in this area showed that Douglas-fir beetle attacks in 1982 averaged 11 trees per acre in the infested areas. One small area of increased activity is on the southwest side of Jackson Mountain just east of Bovill (tables 1 and 2). Extensive blowdown occurred on Federal, State, and private lands in many areas of the Clearwater drainage from Orofino to Headquarters, in the Joseph Plains on Hoo Doo Mountain just south of Priest River and in areas around Cascade, McCall, and Council. These down trees were rapidly occupied by beetles and may provide a stimulation for future losses. Salvage operations removed as many trees as possible.

Fir Engraver Beetle

Fir engraver beetle activity in northern Idaho continued to decline in 1982. A total of 2,426 faders were estimated in 1982 (tables 1 and 2). This compares to 3,448 in 1981. Most of the activity was in the area south of Coeur d'Alene and north of Potlatch. Fir engraver beetle attacks have frequently been associated with trees weakened by root diseases.

Pine Engraver Beetle

Pine engraver beetle activity in northern Idaho was centered around Coeur d'Alene in the Mica reporting area where 2,764 faded trees were counted. The greatest amount of pine engraver beetle mortality in southern Idaho was observed on the Boise National Forest where 1,268 trees were killed. This activity was concentrated in the Boise Basin, Karney Lakes, and Shafer Creek areas.

Western Pine Beetle

Only 98 trees were recorded as killed by western pine beetle in 1982. The attacks occurred in scattered locations where patches of remaining old-growth ponderosa pine occur. This beetle generally attacks old growth and is not expected to be a problem in the future.

Spruce Beetle

The 1981 outbreak of spruce beetle has continued with 1,375 faded spruce trees observed in 1982. All activity was confined to the upper Priest River, Kootenai, and Moyie River areas in northern Idaho. We expect this current infestation to increase during the next few years because of suitable host existing along streams and adjacent mesic areas.

Western Balsam Bark Beetle

This pest of subalpine fir seems to be related to stand conditions and probably the occurrence of root disease. A total of 154 trees were observed in the 1982 survey. Almost all of the damage was confined to higher elevations in the Priest Lake area.

Table 1.--Bark beetle mortaliity and volume losses detected in northern Idaho in 1981-1982.

NATIONAL FOREST [1] or STATE FOREST PROTECTIVE DISTRICT		MOUNTAIN PINE BEETLE Trees [2] killed	MOUNTAIN PINE BEETLE Volume MBF	FIR ENGRAVER BEETLE Trees [3] killed	FIR ENGRAVER BEETLE Volume MBF	DOUGLAS-FIR BEETLE Trees [4] killed	DOUGLAS-FIR BEETLE Volume MBF	PINE ENGRAVER BEETLE Trees [5] killed	PINE ENGRAVER BEETLE Volume MBF	WESTERN BALSAM BARK BEETLE Trees [6] killed	WESTERN BALSAM BARK BEETLE Volume MBF	SPRUCE BEETLE Trees [7] killed	SPRUCE BEETLE Volume MBF
IPNF [8]	1981	522	191.8	699	139.8	277	96.9	45					
	1982	270	108.4	406	80.6	213	74.5	25				1,373	549.2
Clwtr. [9]	1981	212	78.1	--	--	224	78.4	73		15			
	1982	--											
Nezperce	1981	2,814	245.7	114	22.8	2,620	917.0	207		135			
	1982	2,884	257.5	61	12.2	1,114	389.9	5		--	--		
Priest Lake	1981	5	400	45	9.0	78	27.3			68	4.4	0	0
	1982	--	--							134	8.7	2	8
Pend Oreille	1981	2	.15	186	37.2	144	50.4	285					
	1982			133	26.6	52	18.2	178					
Mica	1981	20	1.6	300	60.0	39	13.6	978					
	1982			277	55.4	70	24.5	2,764					
Cataldo	1981	1,211	108.9	65	13.0	40	14.0	27					
	1982	450	40.5	30	6.0	3	1.0	8		5	32.5		
W. St. Joe	1981			909	181.8	81	28.4	428					
	1982			695	139.0	77	26.9	382					
Kendrick	1981			100	20.0	15	5.3	5					
	1982			195	39.0	22	7.7	180					
CPTPA [10]	1981	289	93.9	855	171.0	1,358	475.3	6		15	975		
	1982	442	153.3	412	82.4	442	154.7	5					
Craig Mtns.	1981	54,665	4,919.2	137	27.4	246	86.1	118					
	1982	90,000	8,098.9	217	43.4	51	17.8	249					
Maggie Cr.	1981	2	.16	38	7.6	13	4.6	7					
	1982	--	--	--	--	--	--	50					
TOTALS	1981	59,742		3,448		5,135		2,179		218		0	
	1982	94,046		2,426		2,044		3,846		154		1,375	
Net change		+ 34,304		- 1,022		- 3,091		+ 1,667		- 64		+ 1,375	

1/ All ownerships within National Forest boundaries, or State Forest Protective Districts.
2/ Lodgepole, ponderosa, and western white pine.
3/ Grand fir.
4/ Douglas-fir.
5/ Ponderosa pine, no volume estimates available.
6/ Subalpine fir.
7/ Engelmann spruce.
8/ Idaho Panhandle National Forests. No detection survey conducted for 1982 except for spruce areas.
9/ Clearwater National Forest. Limited detection surveys conducted in 1982.
10/ Clearwater Potlatch Timber Protective Association.

Table 2.--Approximate number of faded bark beetle trees detected in southern Idaho, 1981-1982.

National Forest	Mountain pine beetle	Douglas-fir beetle	Pine engraver	Spruce beetle
Boise				
1981	9,111	795	294	
1982	21,178	290	1,263	--
Caribou				
1981	6,811	158	--	27
1982	12,964	40	--	--
Challis				
1981	350	--	--	--
1982	525	--	--	--
Payette				
1981	29,432	529	--	--
1982	30,316	534	217	--
Salmon				
1981	--	50	54	--
1982	34	84	299	--
Sawtooth				
1981	2,683	157	--	--
1982	4,097	42	--	--
Targhee				
1981	713,447	100	--	--
1982	237,025	--	--	--
TOTALS				
1981	761,834	1,789	348	27
1982	306,139	990	1,779	0

DEFOLIATORS

Western Spruce Budworm

In 1982, the western spruce budworm defoliated approximately 2.25 million acres of Douglas-fir, grand fir, and sulalpine fir throughout Idaho (see Appendix map). Significant increases in both extent and intensity of defoliation occurred in many areas.

Newly discovered areas of defoliation occurred on 9,000 acres of the Weiser Ranger District, Payette National Forest, between Grizzly Basin and Pyramid Point, along the Crooked River drainage, and near Brownlee Guard Station. Elsewhere on this Forest, the infestation intensified predominantly into the moderate-to-heavy defoliation categories. The West Mountain area near Cascade continued to be the most heavily defoliated area on the Forest.

The infestations first noted last year on the Sawtooth and Challis National Forests had the greatest increase in budworm activity in the State. Most of this increase occurred in the light-to-moderate category. On the Challis National Forest, defoliation was concentrated along the north side of the Salmon River drainage from Yankee Fork to Morgan Creek. The majority of the defoliation on the Sawtooth National Forest was within the South Fork of the Boise River drainage.

Infestations on the Boise, Salmon, and Targhee National Forests all increased mainly from expansion of established budworm populations. The greatest increase in defoliation on the Boise National Forest occurred on the southern portion of the Forest, primarily on the Idaho City and Boise Ranger Districts. The majority of the new defoliation on the Salmon National Forest was categorized as light to moderate. In contrast, the defoliation on the Targhee National Forest was largely classified as moderate to heavy.

On the Caribou National Forest and in adjacent State and private lands of eastern Idaho, defoliation and top killing increased considerably beyond that seen in 1981. This was especially evident in the Blackfoot Mountains and in the Caribou Range south of Palisades Reservoir. Table 3 shows the status of the infestation by Forest.

Western spruce budworm defoliation was found on only 4,635 acres of the Salmon River in 1982, and this was in the Idaho portion of the Bitterroot National Forest in the headwaters of the Selway River.

Table 3.--Areas of visible defoliation by western spruce budworm in southern Idaho during 1981 and 1982 as determined from aerial detection surveys.

Forest and adjacent land	Year	Light	Moderate	Heavy	Total		Trend
Boise	1981	165,062	104,091	34,131	303,284		
	1982	140,902	361,643	171,936	674,481	+	371,197
Caribou*	1981	34,908	73,722	35,452	144,082		
	1982	0	106,817	38,436	145,253	+	1,171
Challis*	1981	21,000	0	0	21,000		
	1982	88,120	6,082	792	94,994	+	73,994
Payette	1981	164,837	71,553	64,081	300,471		
	1982	68,640	158,586	138,154	365,380	+	64,909
Salmon	1981	212,863	28,009	493	241,365		
	1982	396,485	36,946	7,176	440,607	+	199,242
Sawtooth	1981	8,292	0	0	8,292		
	1982	40,892	10,723	0	51,615	+	43,323
Targhee	1981	125,728	61,023	22,895	209,646		
	1982	116,985	187,659	181,637	486,281	+	276,636
TOTAL	1981	732,690	338,398	157,052	1,228,140		
	1982	852,024	868,456	538,131	2,258,611		+1,030,472

* Only portions of Forest were flown; actual defoliated acreage figures are probably considerably higher due to infestations being present in wilderness areas.

Douglas-fir Tussock Moth

As in 1981, there was no visible defoliation in the forests in northern Idaho in 1982. However, ornamental trees were defoliated in many locations near or in the towns of Hayden Lake, Coeur d'Alene, Plummer, Genesee, 3½ miles south of Genesee in ornamental trees along Highway 95, in Craigmont, and in several other small towns between Lewiston and Grangeville. Defoliation of ornamentals was also observed in Boise, Shoshone, Gooding, and Hailey. This represents a substantial increase in activity from 1981. Pheromone trapping of adult male moths showed a general increase of moths caught (table 4). Very high increases in trap catches occurred in several locations with 10 plots averaging greater than 20 moths/trap and 11 others averaging between 10 and 20 moths/trap (table 5).

Table 4.--Average Douglas-fir tussock moth pheromone trap catches in Idaho 1980-82.

Area	Number of sample plots	Means of average moth catch/5 traps/sample plot 1980	1981	1982
Sandpoint	2	0	0	.1
Coeur d'Alene	3	0	0	1.0
Plummer-Moscow	15	0	.6	8.6
Plummer-Moscow	14		.7	2.8
NEZPERCE NF				
Selway RD	4	.2	1.2	.7
Slate Cr. RD	5	0	1.6	2.8
Slate Cr. RD	6			1.3
Elk City RD	3			.3
Red River RD	1			.0
Clearwater RD	1	.0	.0	.0
Clearwater RD	6			.6
Craig Mountains	7		2.7	.5
Orofino Area S&P	12		2.8	5.7
Orofino Area S&P	3			8.1
CLEARWATER NF				
Lochsa RD	5		3.6	.2
Canyon RD	8			8.7
Pierce RD	10			.3
Potlatch RD	3			1.8
Powell RD	8			.3
BOISE NF				
Cascade RD	2	-	.07	.3
Mountain Home RD	2	-	-	.3
PAYETTE NF				
Council RD	2	-	-	43.3
McCall RD	1	-	0	.6
Weiser RD	3	-	-	43.3
SALMON NF				
Cobalt	2	-	-	0
North Fork RD	2	-	-	11.4
SAWTOOTH NF				
Fairfield RD	3	-	1.6	5.2
Ketchum RD	1	-	-	2.6
Bellevue	1	-	19.4	16.2

Table 5.--Pheromone trapping plots averaging catches greater than 10 moths/trap in 1982.

	$\bar{X}$ No. Moths	Location
1	61.2	East Fork, Brownlee Cr., Weiser RD
2	53.6	Adams Cr., Weiser RD
3	49.8	Forbit Cr., Council RD
4	36.8	Olive Cr., Council RD
5	35.2	Long Creek, Plummer-Moscow
6	26.2	Johnson's Mill, Orofino
7	24.4	Flat Creek, Plummer-Moscow
8	22.0	Bald Mtn., Orofino
9	21.6	Mineral Mtn., Plummer-Moscow
10	20.2	Skull Creek, Canyon RD
11	16.2	Swanson Creek, Canyon RD
12	16.2	Sheeps Canyon, Bellevue RD
13	15.8	Charles Butte, Plummer-Moscow
14	15.4	Big Bear Creek, Plummer-Moscow
15	15.2	Colson Cr., North Park RD
16	15.2	Bear Saddle, Weiser RD
17	14.0	Grangemont, Orofino
18	13.6	Little Water Gulch, Fairfield RD
19	13.4	Lolo Creek, Plummer-Moscow
20	13.2	Christie Creek, Slate Creek RD
21	10.4	Shin Point Sale, Canyon RD

Despite this increase of observed activity we do not expect to observe widespread visible defoliation in northern Idaho in 1983. This is because a similar pheromone trapping program in Oregon and Montana last year produced catches up to twice as high as our highest 1982 catch, yet they did not have widespread defoliation this year.

In northern Idaho, areas with high pheromone trap catches will be followed up with an egg mass/pupal case survey during the winter of 1982-83 and an early instar larval survey will be conducted in the spring of 1983 to obtain more precise population information.

The Douglas-fir tussock moth is known to have population cycles approximately every 9-10 years. Since the last outbreak collapsed in 1974, and with the increasing pheromone trap catches and defoliation of ornamental trees, we anticipate the population is building up to outbreak levels. Pest management plans are currently being developed in anticipation of an outbreak.

In southern Idaho, defoliation of Douglas-fir in the Owyhee Mountains expanded to 9,000 acres in 1982. Moderate to heavy defoliation was observed around South Mountain, Little Sawmill Creek, Dewey Peak, Washington Gulch, and Flint Creek.

Larch Casebearer

Activity of the larch casebearer has declined significantly throughout Idaho. Only scattered pockets of defoliation were seen on the Boise and Payette National Forests of southern Idaho. In northern Idaho the population is so low that in many areas casebearers are actually hard to find. This drastic reduction of populations is assumed to be due to the combined influence of the parasite introduction program and the competition exhibited by a larch needlecast and needle blight over the past several years. Surveys have shown the parasites to be well established throughout the Region and they should now be able to exert a controlling influence on the casebearer.

Pine Butterfly

The pine butterfly has increased in 1982. Populations have been found in ponderosa pine stands of southern Idaho on the Boise, Payette, and Salmon National Forests and adjacent State and private lands in southwestern Idaho. In 1981 defoliation was limited, but in 1982 over 5,500 acres were moderately to heavily defoliated around Dry Buck Summit on the Boise National Forest. An additional 300 acres of private lands near Arling Hot Springs, east of Cascade Reservoir, were severely defoliated. Viable egg masses were recovered from ponderosa pine stands on the Boise, Payette, and Salmon National Forests indicating that the outbreak will persist and perhaps intensify in 1983.

In northern Idaho there have been scattered reports of butterfly populations in the Clearwater area and at Winchester State Park near the town of Winchester, Idaho.

MISCELLANEOUS INSECTS

Western Tussock Moth

There are approximately 7,000 acres of mixed ownership lands in the area of the Idaho City and Emmett Ranger Districts infested with the western tussock moth. The principal hosts for this insect are willow and ceanothus. Ponderosa pine is also known to be fed on quite heavily when the principal hosts are depleted. The 1982 population has been found to be highly infected with a naturally occurring virus which is expected to collapse the outbreak.

Pyralid Moth

A species of Dioryctria, possibly D. abietivorella, girdled and killed approximately 2 million Engelmann spruce seedlings at the Lucky Peak Nursery, Boise National Forest. It appears this is the first record of damage caused by this pest in a nursery setting. This insect usually feeds on cones of various conifers. Assessments will continue throughout the winter and spring of 1983 to develop management guidelines.

Cranberry Girdler Moth

The cranberry girdler moth, which is a sod webworm, has recently been identified as a pest in beds of seedlings at the Coeur d'Alene Nursery near Coeur d'Alene, Idaho. Damage was first noticed in 1980 when many 2-year-old Douglas-fir seedlings were damaged just below the ground line. Damage looked like feeding caused by rodents or cutworms (fig. 1). Nurserymen in Oregon and Washington have been finding this type of feeding since the late seventies, and in 1979 determined it to be caused by the cranberry girdler.

Figure 1.--Cranberry girdler moth feeding damage to Douglas-fir seedling.

This sod webworm is an economic pest in commercial grass seed fields that surround the Coeur d'Alene Nursery. The moths are probably drifting into the Nursery from the grassfields, and finding a uniform canopy of seedlings, they deposit their eggs. The larvae then feed on developing seedlings.

Flatheaded Fir Borer, Douglas-fir Engraver Beetle, and Hemlock Engraver Beetle

This group of beetles has been found killing small (6- to 10-inch d.b.h.) Douglas-fir in a timber sale in southeastern Idaho. The timber sale has continued over several years, annually creating slash as a food source allowing the beetles to build up and maintain high populations. With the termination of the timber sale they have begun to attack standing trees. The flatheaded fir borer killed trees by itself while the other two beetles were often found together in the same tree. While the total number of trees killed has not been great, they were all designated as leave trees to be managed for the next rotation.

Gypsy Moth

The Idaho Department of Agriculture has now assumed overall responsibility for the gypsy moth survey in Idaho. In cooperation with the Idaho Department of Lands, pheromone traps were placed throughout Idaho. No gypsy moths were found.

Douglas-fir Needle Midge

Outbreaks of this midge seem to occur at 10- to 15-year intervals in northern Idaho. Very heavy defoliation that was mistaken for western spruce budworm was detected in the "island area" west of the Salmon River in the late 1960's. In 1982 heavy defoliation was evident in Douglas-fir stands along the Priest River Valley. Damage seems to be scattered through approximately 36,000 acres although it is probably present in other areas of concentrated Douglas-fir. It is mainly an economic pest in Christmas tree plantations because current needles with "galls" are shed.

Western Pine Shoot Borer

An impact survey of the western pine shoot borer was conducted in selected ponderosa pine plantations of northern Idaho. Eight plantations, five on the Clearwater National Forest and three on the Idaho Panhandle National Forests, were surveyed. An average of 11.7 percent of the trees had infested internodes (range 5-25 percent). This represents an overall 5-11 percent (plantation average) height growth reduction. Individual infested trees suffered approximately a 30 percent reduction in height growth.

Sequoia Pitch Moth

Numerous large ponderosa pine were infested by the sequoia pitch moth along the Salmon River upstream from Riggins. The greatest concentration of infested trees was in and adjacent to the Spring Bar Campground.

Profuse amounts of resin issued from points of attack, and in some cases completely coated the lower 20-30 feet of the trunk. Even the ground around these trees was heavily covered with pitch creating an extremely hazardous fire situation. A few widely scattered trees were observed that had been killed by the western pine beetle. These trees had probably been predisposed to the beetle by the pitch moth attack.

DISEASES

FOLIAGE DISEASES

Larch Foliage Diseases

Discoloration of western larch by Meria needle cast and Hypodermella needle blight, which were prevalent throughout the host type during 1980 and 1981, declined significantly this year. However, localized stands of larch with moderate levels of discoloration were detected in the French Creek, Elkhorn Creek, Lick Creek, and Partridge Creek drainages on the Payette National Forest. There were also isolated groups of trees with moderate infection levels of both needle pathogens observed in the St. Joe and Panhandle areas.

Red Band Needle Blight

Incidence of this disease declined the past year. However, blighted trees were still observed near the Wilderness Gateway Campground, Clearwater National Forest.

Lophodermium Needle Cast on Christmas Trees

Surveys during the past 2 years indicate that this disease has not spread beyond the three small plantations near Sandpoint where it was originally observed causing severe losses. After several hundred of the most severely infected trees were burned, periodic fungicide sprays reduced levels of infection such that most remaining trees are recovering.

Elytroderma Needle Cast

Elytroderma needle disease maintained a high level of infection in a thinned ponderosa pine stand within the Johnson Creek drainage, Boise National Forest. Scattered mortality of heavily infected trees was associated with attack by the western pine beetle. Greatly increased levels of infection were also observed in the Hull Creek, Spring Creek, and Fourth of July drainages on the North Fork Ranger District of the Salmon National Forest.

Incidence of the disease in northern Idaho ponderosa pine stands is relatively static, although a localized outbreak was observed near Bayview on Lake Pend Oreille last spring.

Pine Needle Rust

Pine needle rust was widespread in lodgepole pine plantations on the Ashton Ranger District of the Targhee National Forest. The fungus was very conspicuous this spring, producing numerous tiny, tongue-shaped blisters (aecia) on older needles. Damage was much less apparent after the current-year flush of new needles.

Miscellaneous Foliage Diseases

Lodgepole pine needle cast is a chronic problem in many stands throughout Idaho but infection levels were generally low this year.

Rhabdocline needle cast of Douglas-fir is also a common disease, especially in southern Idaho stands of Douglas-fir. Infection was extremely low this year, even in areas which normally have high infection.

A needle rust on true firs was observed at moderate levels in localized areas of southwestern Idaho.

Subalpine fir in localized areas at high elevations around Priest Lake were moderately to heavily infected by a needle cast disease which produced symptoms similar to those caused by frost or spruce budworm.

Marssonina leaf spot on aspen has greatly declined over the past 2 years, especially in southwestern Idaho. However, ink spot of aspen caused severe defoliation in one aspen clone on the Targhee National Forest.

ROOT DISEASES

Root diseases cause important losses to commercial forest stands throughout Idaho. Losses are especially severe in the northern part of the State. Much root disease activity is frequently associated with attacks by bark beetles, especially the Douglas-fir beetle, fir engraver, western balsam bark beetle, and western pine beetle.

Root disease impact surveys were recently completed for the Clearwater National Forest using procedures reported last year for the Nezperce National Forest. Large-scale color infrared photographs were used to locate suspected root disease centers for ground checking. Results indicate that about 35 percent of all tree mortality on the Forest is associated with root diseases (table 6). This estimate is based on identifying root pathogens at the root crown or adjacent lateral roots on symptomatic trees. There may actually be many more infected trees without external crown symptoms. This has been shown to occur in many stands throughout northern Idaho and western Montana. Our survey confirms that root diseases are important mortality factors on the Clearwater National Forest. Surveys on other forested areas in northern Idaho also confirm the importance of root diseases in many commercial stands.

Table 6.--Root disease mortality and volume losses on the Clearwater National Forest, Idaho.

Mortality category 1/	Number of trees	Volume MM cu. meters
Current root disease	49,200	8.0
Older root disease	3,257,900	2,293.4
Total root disease	3,307,100	2,301.4
Other mortality	6,153,800	4,624.3
Total mortality	9,460,900	6,925.7

1/ Based on crown symptoms and mortality patterns discernible from large scale aerial photographs.

Surveys of several areas of windthrown trees on the Nezperce and Payette National Forests showed that about 25 percent of the Douglas-fir and Engelmann spruce examined had root disease.

Brown cubical butt rot was common in the windthrown Douglas-fir while much of the Engelmann spruce was infected with annosus root disease.

Preliminary evaluations of the root systems of windthrown spruce in the Boise and Payette National Forests indicated presence of annosus root disease, tomentosus root disease, and red ring rot. Decay organisms found in Douglas-fir were not identified, although brown cubical and white pocket decays were frequently observed.

Annosus root disease was found at several locations on the Nezperce National Forest. Subalpine fir was the major host, although several grand fir were also infected. The fungus was also associated with other root pathogens in the St. Joe and Panhandle areas and in a timber sale on private land near Spirit Lake.

Laminated root rot was recently located on the Nezperce National Forest. Several infected trees and stumps were located southeast of Grangeville. This is considerably south of the range generally known for this disease.

Several years ago, root-diseased ponderosa pine were located near Bovill by personnel of the University of Idaho. Infected trees had extensive black-stained root systems. Recent surveys indicate that the

disease has spread rapidly throughout ponderosa pine along the upper drainages of Nat Brown Creek and has caused considerable mortality over the past few years (fig. 2). The disease has apparently been restricted to ponderosa pine and is occasionally accompanied by Armillaria root disease. Rapid disease spread may indicate an active role of root-feeding insects in causing new infections.

Figure 2.--Ponderosa pine mortality caused by blackstain root disease near Bovill, Idaho.

Root disease spread and development within infection centers are being monitored at several locations in northern Idaho. Thirty percent of the trees selected with some degree of infection by Armillaria or laminated root disease have died within 12-18 months while symptoms (increased crown thinning, needle chlorosis, and basal pitching) have progressed in another 22 percent of the trees. Many trees adjacent to the selectively tagged trees have also died or declined during this period.

DWARF MISTLETOES

Dwarf mistletoes attack most of our major commercial tree species throughout Idaho. Severe infections can reduce wood quality, cone crops, and growth, and may predispose trees to attack by other agents. Aerial detection surveys do not usually include dwarf mistletoe since disease spread is relatively slow, and only the heavily infected trees can be seen.

Dwarf mistletoe-caused growth reduction in many south Idaho conifer stands is substantial. However, incidence of the disease in commercial lodgepole pine stands has been reduced during the last 5 years through

the use of proper silvicultural treatments in infected stands. In the most heavily infected stands, additional dwarf mistletoe suppression projects are planned to further reduce disease impacts.

In north Idaho, Douglas-fir and larch are the primary hosts, but infection is generally restricted to small areas in any particular stand. The mixed species composition of most stands tends to reduce dwarf mistletoe impact. Species manipulation, sanitation, and other silvicultural treatments are being integrated with other timber management activities to reduce costs and improve effectiveness of control.

STEM CANKERS

White Pine Blister Rust

Losses from white pine blister rust have declined over the past few years as much of our mature white pine has been logged and stands regenerated with a mixture of other species. However, white pine is a highly desirable, fast-growing species which will continue to be encouraged for timber production on many sites. A comprehensive management guide for white pine is currently being developed to assist forest managers in hazard rating areas and making recommendations for using white pine planting stock. Under consideration are control procedures such as pruning infected branches, excising cankers, thinning infected trees, silvicultural reduction of Ribes, and conifer species manipulation.

Stalactiform Rust Canker

Stalactiform rust was located in lodgepole pine stands in central Idaho. Incidence of this disease usually does not significantly change over time.

NURSERY DISEASES

Grey Mold

Grey mold was the most important disease of containerized conifers at the Coeur d'Alene Nursery. Infection was common in western larch and Engelmann spruce and became most apparent when trees were removed from the greenhouse and placed under lathhouse shade. As summer weather became warmer and drier, infection decreased.

Grey mold was also located on 2-0 western larch seedbed stock. A test of selected fungicides to control this disease was initiated in these beds.

Meria Needle Cast

Several groups of defoliated 2-0 western larch seedlings were found at the Coeur d'Alene Nursery (fig. 3). Infected trees experienced premature needle loss. Meria needle cast and grey mold were associated with the defoliation.

Figure 3.--Western larch seedlings infected with Meria needle cast.

Lophodermium Tip Blight

Tip blight was common on much of the 2-year-old ponderosa pine seedling stock lifted during the spring at the Coeur d'Alene Nursery. Although very little premature needle loss was associated with the disease, infected needle tips became brown and necrotic and often broke off during lifting and handling operations. As a result, infected trees lacked needle tips and appeared to have been fed upon by animals. Fungal fruiting bodies were usually found on necrotic needle tips. The disease had little effect on first season field survival; trees often produced new flushes of growth that appeared uninfected.

Sirococcus Tip Blight

Sirococcus tip blight caused serious damage to ponderosa pine seedlings at two private nurseries near Bonners Ferry. A program of fungicide applications and roguing heavily infected trees significantly reduced losses at one nursery. However, at the other nursery, infection levels continued to exceed 90 percent although actual mortality rates were low. Several fungicides were recently tested to control the disease. Bayleton® gave better control using low pressure spray techniques than chlorothalonil (Bravo®), which was used previously. Fungicide tests will be continued.

White Pine Root Disease

Several 1-year-old western white pine seedbeds at the Coeur d'Alene Nursery had patches of dead and dying trees. Affected trees had extensive root decay caused by Fusarium and Pythium root diseases. Poor soil fumigation may have been partially responsible for the disease.

Western Gall Rust

Western gall rust was found on ponderosa pine seedlings in several locations at the Coeur d'Alene Nursery. Infected trees with well-formed galls were quite noticeable. Although most gall rust-infected trees were culled during sorting operations, some diseased trees were no doubt shipped for outplanting. Not all infected trees have distinctive galls, since about a year is required for gall formation following infection.

List of Recent Publications

Beveridge, R. L. and R. W. Thier.
1982. HAZARD: A computer program to rate potential for mountain pine beetle activity in lodgepole and ponderosa pine stands in the Intermountain Region. USDA For. Ser., Intermtn. Region, State and Private Forestry, FPM Rept. 82-11.

Byler, J. B.
1982. An assessment of root diseases in the Northern Region. USDA For. Ser., Northern Region, Rept. 82-21. 12 pp.

Byler, J. W., R. L. James, and S. H. Dubreuil.
1982. Etiology and distribution of root diseases on northern Rocky Mountain conifers. Phytopathology 72: 966 (Abstr.).

Dewey, Jerald E. and Michael J. Jenkins.
1982. An evaluation of cone and seed insects in selected seed production areas in R-1. USDA For. Ser., Northern Region, FPM Rept. 82-5.

Dewey, Jerald E., R. Ladd Livingston, and Steve Kohler.
1982. Douglas-fir tussock moth adult male survey in north Idaho. 1981. USDA For. Ser., Northern Region, FPM Rept. 82-20.

Dubreuil, S. H.
1982. Western larch needle blight and needlecast in the Northern Region. USDA For. Ser., Northern Region FPM Rept. 82-9. 14 pp.

Dubreuil, S. H. and N. E. Martin.
1982. Development of root galls on Phaeolus schweinitzii infected Douglas-fir (Pseudotsuga menziesii). Phytopathology 72(7) p. 929. (Abstr.).

Dubreuil, S. H. and N. E. Martin.
1982. Occurrence, symptoms, and interactions of Phaeolus schweinitzii and associated fungi causing decay and mortality of conifers. Phytopathology 72(7) p. 930 (Abstr.).

Dubreuil, S. H. and N. E. Martin.
1982. Symptoms and distributions of Phaeolus schweinitzii and Armillaria mellea in root systems within mixed conifer stands. Phytopathology 72(7) p. 967 (Abstr.).

Fellin, David G. and Jerald E. Dewey.
1982. Western spruce budworm. Forest Insect & Disease Leaflet 53. USDA For. Ser., 10 pp.

Hoffman, J. T. and S. Donnelly.
1982. Biological evaluation of proposed dwarf mistletoe projects on the Payette National Forest, Idaho. USDA For. Ser., Intermtn. Region, State and Private Forestry, FPM Rept. 82-7.

Hungerford, R. D., R. E. Williams, and M. A. Marsden.
1982. Thinning and pruning western white pine. A potential for reducing mortality due to blister rust. USDA For. Ser., Res. Note INT-322. 7 pp.

James, R. L., S. Tunnock, R. L. Livingston, J. Schwandt, D. Beckman, R. E. Williams, and J. A. E. Knopf. 1982. Forest insect and disease conditions in Idaho - 1981. USDA For. Ser., Idaho Dept. of Lands Rept. 82-1. 35 pp.

James, R. L.
1982. Pythium root disease of Douglas-fir and grand fir seedlings at the Coeur d'Alene Nursery, Idaho. USDA For. Ser., Northern Region, Rept. 82-10. 10 pp.

James, R. L., C. A. Stewart, and S. Matthews.
1982. Evaluation of thinning effects on root disease mortality of young conifer regeneration on the Red River Ranger District, Nezperce National Forest, Idaho - Establishment Report. USDA For. Ser., Northern Region, Rept. 82-16. 23 pp.

James, R. L., J. Y. Woo, and J. F. Myers.
1982. Evaluation of fungicides to control Botrytis blight of containerized western larch and lodgepole pine at the Coeur d'Alene Nursery, Idaho. USDA For. Ser., Northern Region, Rept. 82-17. 13 pp.

James, R. L., C. A. Stewart, R. E. Williams, and J. W. Byler.
1982. Root disease mortality of northern Rocky Mountain conifers. Phytopathology 72: 966 (Abstr.).

James, R. L. and F. W. Cobb, Jr.
1982. Variability in virulence of Heterobasidium annosum isolates from ponderosa and jeffrey pine in areas of high and low photochemical air pollution. Plant Dis. 66: 835-837.

James, R. L., F. W. Cobb, Jr., and J. R. Parmeter, Jr.
1982. Effects of ozone on sporulation, spore germination, and growth of Fomes annosus. Phytopathology 72: 1205-1208.

James, R. L. and D. Genz.
1982. Evaluation of fungal populations on ponderosa pine seed. USDA For. Ser., Northern Region, Rept. 82-22. 21 pp.

Knopf, J. A. E.
1982. Attraction and containment of Ips beetles by large slash piles. USDA For. Ser., Intmtn. Region, State and Private Forestry, FPM Rept. 82-8.

Livingston, R. L.
1982. Mountain pine beetle evaluation for the Elk City Township and surrounding lands. Clearwater Administrative Area, 1981-1982. Idaho Dept. of Lands, Rept. 82-3. 8 pp.

Livingston, R. L., J. W. Schwandt, J. Preston, W. Ciesla, B. Davidek, D. Beckman, L. Spickelmire, and R. Johnson. 1982. 1979 western spruce budworm control project, Cascade, Idaho. Idaho Dept. of Lands, Rept. 82-4. 64 pp.

Marshall, J. P.
1982. Inoculation of Pisolithus tinctorius for ectomycorrhizal development on pine seedlings, Lucky Peak Nursery, Idaho. USDA For. Ser., Intrmtn. Region, State and Private Forestry, FPM Rept. 82-5.

McGregor, Mark.
1982. The current situation of the mountain pine beetle in the United States and resource involved. Proceedings of the joint CANADA/USA Workshop on mountain pine beetle related problems in western North America.

Schwandt, J. W.
1982. A practical computerized street tree inventory. Idaho Dept. of Lands, Rept. 82-2. 20 pp.

Stewart, C. W., R. L. James, and W. E. Bousfield.
1982. A multistage sampling technique to assess root disease impact on the Clearwater and Nezperce National Forests, Idaho. USDA For. Ser., Northern Region, Rept. 82-14. 33 pp.

Stipe, L. E.; Chris G. Niwa; K. E. Gibson; H. E. Meyer; R. Eder; and W. Ciesla. 1983. B.t. pilot project against western spruce budworm in central Montana, 1981. USDA For. Ser., State and Private Forestry, CFPM Rept. 83-4. (In press).

Thier, R. W.
1982. Douglas-fir tussock moth monitoring in southern Idaho during 1981. USDA For. Ser., Intrmtn. Region, State and Private Forestry, FPM Rept. 82-6.

Thier R. W.
1982. Establishment of Agathis pumila (Ratz.) and Chrysocharis laricinellae (Ratz.) for control of larch casebearer. USDA For. Ser., Intrmtn. Region, State and Private Forestry, FPM Rept. 82-2.

Thier R. W.
1982. Pine butterfly, Boise and Payette National Forests, Idaho, 1981. USDA For. Ser., Intrmtn. Region, State and Private Forestry, FPM Rept. 82-1.

Tunnock, Scott.
1982. Cranberry girdler moth damage to Douglas-fir seedlings in Coeur d'Alene Nursery, Panhandle National Forest, Idaho. USDA For. Ser., State and Private Forestry, CFPM Rept. 82-28. 6 pp.

Williams, R. E., D. Beckman, L. Livingston, and D. B. Cahill.
1982. Western spruce budworm egg mass survey, Boise/Payette National Forests and adjacent forest land, 1981. USDA For. Ser., Intrmtn. Region, State and Private Forestry, FPM Rept. 82-9.

USDA Forest Management.
1981. Forest insect and disease conditions. Intrmtn. Region, USDA For. Ser. 24 pp.

DIRECTORY OF PERSONNEL

Idaho Department of Lands, Bureau of Private Forestry
P. O. Box 670
Coeur d'Alene, ID 83814

Dewey P. Almas - Bureau Chief
R. Ladd Livingston - Section Supervisor, Entomologist
John W. Schwandt - Forest Pathologist
David P. Beckman - Technician, I&D Section

USDA Forest Service, Northern Region (1)
Federal Building
P. O. Box 7669
Missoula, MT 59807

John H. Thompson - Staff Director
William L. Stewart - Regional Ecologist
Wendel Hann - Range Conservationist
James Byler - Pathology Group Leader
Oscar Dooling - Forest Pathologist
Suzanne H. Dubreuil - Forest Pathologist
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Jerald E. Dewey - Entomology Group Leader
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Chris Niwa - Forest Entomologist
Catherine A. Stewart - Biological Technician
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Robert G. Eder - Computer Speicalist

USDA Forest Service, Intermountain Region (4)
Federal Building
324 25th Street
Ogden, UT 84401

Max M. Ollieu - Staff Director
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APPENDIX

FIR ENGRAVER ATTACKS, 1982

Map designation	No. dead trees
1	100
2	100
3	525
4	75
5	225
6	130

DOUGLAS-FIR BEETLE ATTACKS, 1982

Map designation	No. dead trees
A	175
B	150
C	675
D	200
E	100
F	250
G	300

PINE ENGRAVER ATTACKS, 1982

Map designation	No. dead trees
1	1,200
2	575
3	775
4	300
5	400
6	175

MOUNTAIN PINE BEETLE ATTACKS, 1982

Map designation	Host	No. dead trees
NORTH IDAHO		
Latour Creek	LPP	3,000
Soldier's Meadows Reservoir	LPP	90,000
Elk City	LPP	2,500
Elk River	WWP	80

MOUNTAIN PINE BEETLE ATTACKS, 1982 cont.

Map designation	Host	No. dead trees
SOUTHWEST IDAHO		
Lick Creek	LPP	260
McCall-Donnelly	LPP & PP	31,000
Lost Valley Reservoir	LPP	340
Little Goose Creek	LPP	1,230
Scott Valley-Horse Thief Reservoir	LPP & PP	675
Alpha	LPP	950
Deadwood River	LPP	350
High Valley	LPP	250
Graham	LPP	1,450
Atlanta	LPP	1,150
Roaring River	LPP	1,350
Fall Creek	LPP	300
Headquarter Camp Creek	LPP	360
Westernhome Gulch	LPP	270
Prairie Creek	LPP	180
Baker Creek	LPP	250
Oregon Gulch	LPP	330
Allen Mountain	LPP	340
Warm Springs Creek	LPP	1,450
Buttercup Creek	LPP	170
Mayfield Creek	LPP	200
Yankee Creek	LPP	270
Squaw Creek	LPP	350
East Mountain	LPP & PP	18,000
Smith's Ferry	LPP & PP	350
Deadwood Reservoir	LPP & PP	750
EASTERN IDAHO		
Inland Park Area	LPP	195,000
Grandview Point	LPP	550
Palisades Reservoir	LPP	13,250
Pleasant Valley	LPP	1,150
Signal Mountain - Sawtell Peak	LPP	40,350

DOUGLAS-FIR BEETLE
MOUNTAIN PINE BEETLE
PINE ENGRAVER BEETLE

1982

UNITED STATES
DEPARTMENT OF THE INTERIOR
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STATE OF IDAHO

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FIR ENGRAVER BEETLE
WESTERN SPRUCE BUDWORM
SPRUCE BEETLE
1982

UNITED STATES
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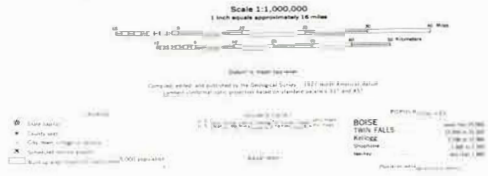

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INDEX OF INSECTS AND DISEASES

Common name	Scientific name	Page
INSECTS		
Cranberry girdler moth	Chrysoteuchia topiara Zeller. . . .	11
Douglas-fir beetle	Dendroctonus pseudotsugae Hopk. . .	3
Douglas-fir engraver	Scolytus unispinosus LeConte . . .	12
Douglas-fir needle midge	Contarinia pseudotsugae Condrashoff	12
Douglas-fir tussock moth	Orgyia pseudotsugata McDunnough . .	7
Fir engraver	Scolytus ventralis LeConte.	3
Flatheaded fir borer	Melanophila drummondi (Kirby) . . .	12
Gypsy moth	Lymantria dispar (L.)	12
Hemlock engraver	Scolytus tsugae (Swaine).	12
Larch casebearer	Coleophora laricella (Hub.)	10
Mountain pine beetle	Dendroctonus ponderosae Hopk. . . .	2
Pine butterfly	Neophasia menapia (Felder & Felder)	10
Pine engraver	Ips pini (Say).	3
Pyralid moth	Dioryctria abietivorella (Grotė). .	11
Sequoia pitch moth	Vespamima sequoiae (Hy. Edwards). .	12
Spruce beetle	Dendroctonus rufipennis (Kirby) . .	3
Western balsam bark beetle	Dryocoetes confusus Swaine	3
Western pine beetle	Dendroctonus brevicomis LeConte . .	3
Western pine shoot borer	Eucosma sonomana Kearfott	12
Western spruce budworm	Choristoneura occidentalis Freeman.	6
Western tussock moth	Orgyia vetusta gulosa Hy. Edwards .	11
DISEASES		
Annosus root disease	Fomes annosus Fr. Cke. . . . . (=Heterobasidion annosum (Fr.)Bref.))	15
Armillaria root disease	Armillaria mellea (Vahl. ex Fr.). .	16
Black stain root disease	Verticicladiella wageneri Kend. . .	15
Brown cubical butt rot	Phaeolus schweinitzii (Fr.) Pat. .	15

		Page
DISEASES, cont.		
Dwarf mistletoes	Arceuthobium spp.	16
Elytroderma needle cast	Elytroderma deformans (Weir) Darker	13
Fir needle rust	Pucciniastrum spp.	14
Fusarium root disease	Fusarium spp.	18
Grey mold	Botrytis cinerea Pers. ex Fr. . . .	17
Hypodermella needle blight	Hypodermella laricis Tub.	13
Ink Spot of aspen	Ciborina (Sclerotinia) bifrons (Whetz.) Whetz.	14
Laminated root rot	Phellinus weirii (Murr.) Gilb. . .	15
Lodgepole pine needle cast	Lophodermella concolor (Dearn.) Darker.	14
Lophodermium needle cast	Lophodermium seditiosum, Minter, Staley, Miller (=L. pinastri (Schrad. ex Hook,) Chev.). . . .	13
Lophodermium tip blight	Lophodermium sp.	18
Marssonina leaf spot	Marssonina populi (Lib.) Magn. . .	14
Meria needlecast	Meria laricis Vuill.	17
Pine needle rust	Coleosporium asterum (Diet.) Syd. .	14
Pythium root disease	Pythium ultimum Trow. Pythium aphanidermatum (Eds.) Fitz.	18
Red band needle blight	Scirrhia pini (Funk and A. K. Parker)	13
Rhabdocline needle cast	Rhabdocline pseudotsugae Syd. . . .	14
Sirococcus tip blight	Sirococcus strobilinus Preuss. . .	18
Stalactiform rust canker	Peridermium stalactiforme Arth. & Kern (=Cronartium coleosporioides Arth.).	17
Tomentosus root rot	Polyporus tomentosus Fr.	15
Western gall rust	Endocronartium harknessii (J. P. Moore) Y. Hirat.	19
White pine blister rust	Cronartium ribicola Fish. ex Rabh..	17